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Personality Traits, Self-Employment, and Professions

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Personality Traits, Self-Employment, and Professions

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October 2010

Abstract

We investigate the effect of broad personality traits—the Big Five—on an individual's decision to become self-employed. In particular, we test an overall indicator of the entrepreneurial personality. Since we find that the level of self-employment varies considerably across professions, we also perform the analysis for different types of professions, namely, those classified as being in the "creative class" as compared to the noncreative class. The analysis is based on micro data for individuals of the German Socio Economic Panel (SOEP). We find a significant association between personality traits and the propensity be become self-employed. However, the strength of this link is fairly weak and differs across professions, indicating an important effect of an individual's profession on his or her decision to run an own business.

JEL classification: L26, Z1, D03

Keywords: Entrepreneurship, self-employment, personality traits, the Big Five, professions

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1. Introduction

The determinants of entrepreneurship are investigated by researchers in several disciplines, their focus varying with the specific discipline. For example, economists stress mainly socioeconomic variables, whereas analyses by psychologists highlight characteristics of an individual's personality that may be more or less conducive to entrepreneurship (see, e.g., Brandstätter [1]; Rauch and Frese [2]; Zhao and Seibert [3]; Stewart et al. [4]; Ekelund et al. [5]). Empirical investigations that include measures for socioeconomic *and* psychological influences are rare, however. This paper fills in this gap by combining socioeconomic determinants of entrepreneurship with personality characteristics. In particular, we investigate the contribution of indicators that are intended to reflect an individual's personality, namely, the so-called Big Five approach to personality measurement (Costa and McCrae [6]). A second aim of this paper is to investigate differences in the determinants of entrepreneurship between classes of professions. We therefore perform our analyses for different groups of professions according to the "creative class" typology introduced by Florida [7].

The following section (Section 2) discusses the impact of personality traits on entrepreneurship and introduces a measure of an entrepreneurial personality as an overall construct. Section 3 outlines the data and explicates estimation issues. Results of the multivariate analyses of the determinants of self-employment for the whole sample and for different professional groups are presented in Sections 4 and 5. The final section (Section 6) concludes the paper and discusses avenues for further research.

2. The entrepreneurial personality

A great many empirical studies show that factors outside the narrowly defined sphere of economics may have an important effect on someone's decision to become self-employed (for an overview, see Parker [8], 107–113). The finding that many entrepreneurs, especially in the early stage of establishing a new business venture, earn significantly less than dependently employed persons

with the same characteristics (e.g., Benz & Frey [9]; Hamilton [10]) may be viewed as an indication of a non-pecuniary motivation for setting up an own business. Accordingly, a study by Carter et al. [11] could not identify any difference between nascent entrepreneurs and non-entrepreneurs in their desire for financial success.

In searching for an explanation of this phenomenon, researchers look at psychological traits of entrepreneurs, including, among other, over-optimism (Koellinger et al. [12]; Camerer and Lovallo [13]; Cooper et al. [14]; Busenitz and Barney [15]; Fraser and Greene [16]; Lowe and Ziedonis [17]), self-efficacy (Utsch et al. [18]; Zhao et al. [19]; Chen et al. [20]), relatively low risk-averseness (Caliendo et al. [21]; Ekelund et al. [5]; Stewart and Roth [22]), desire to realize an internal locus of control, and need for achievement. Indeed, most of these studies find support for the hypothesis that personality traits play an important role in the decision to become self-employed.[1] Apart from these traits, the Big Five model of personality provides a framework for analyzing the relationship between personality traits and the propensity to become an entrepreneur. The Big Five model is a comprehensive personality taxonomy that includes following dimensions: extraversion, openness to experience, agreeableness, conscientiousness, and emotional stability (Costa and McCrae [6]). A number of empirical analyses use the Big Five factors to analyze the relationship between personality and entrepreneurship. For example, Zhao and Seibert [3] investigate the personality characteristics of business founders as compared to those of dependently employed managers. Their findings indicate that self-employed individuals are different from managers on the dimensions of openness to experience, conscientiousness, neuroticism, and agreeableness. Schmitt-Rodermund [23] reports that early entrepreneurial interest is related to higher levels of openness to experience, extraversion, and conscientiousness. Although these studies reveal a considerable relationship between single

[1] Rauch and Frese [2] provide a detailed meta-analysis of the relationship between personality traits and entrepreneurship.

personality traits and entrepreneurship, the effect of personality characteristics for entrepreneurship is still not entirely clear (see Rauch and Frese [2]).

One obvious problem that empirical studies face, particularly those that use self-employment as a proxy for entrepreneurship, is the possibility that personality traits are to some degree endogenous. Specifically, it could be argued that being an entrepreneur for a longer period of time has a feedback effect on personality so that the wrong direction of causality is presumed. The literature on the Big Five is not in complete agreement as to the stability of personality traits across the life course. According to a prominent perspective by McCrae and Costa [24], personality is "set like plaster" by age 30 and remains largely uninfluenced by environment. Soldz and Vaillant [25], who followed respondents from the end of their college careers over the next 45 years, provide evidence that personality traits are highly stable in terms of rank-order correlations over adulthood. In contrast, the proponents of the developmental perspective suggest that personality is prone to change (Lewis [26]). The meta-analytical studies by Roberts and DelVecchio [27] and Caspi et al. [28], as well as a theoretical investigation by Fraley and Roberts [29] find support for a golden mean between these two extremes. Specifically, they show that rank-order stability increases with age and peaks after age 50. Moreover, the results suggest that the magnitude of rank-order stability is not "set like plaster," even though it is remarkably high, with the highest probability of change during young adulthood. In their longitudinal study of college students, Robins et al. [30] investigate the issue of the stability of personality in young adulthood and find an impressive, though not perfect, degree of continuity. To the best of our knowledge, there is no empirical evidence regarding the influence of self-employment experience on personality. There is, however, some indication that basic personality dimensions are uninfluenced by life events such as being laid off, fired, or changing jobs (see Costa et al. [31]) and that personality is not entirely situation-specific (Borghans et al. [32]). We assume, therefore, that personality is a determinant of self-employment while self-employment experience has no significant effect on the basic personality traits as measured

by the Big Five. We provide some test of this assumption by running a model restricted to those entrepreneurs who had just become self-employed.

In a recent study, Obschonka, Silbereisen and Schmitt-Rodermund [33] argue that focusing merely on the relationships between single personality traits and entrepreneurial intentions may be misleading because this approach ignores the holistic structure of a personality. They construct an overall measure of an entrepreneurial personality on the basis of the Big Five approach, which is determined by its closeness to a specific entrepreneurial reference type. According to this approach, the entrepreneurial reference type is defined by the highest possible scores on extraversion, conscientiousness, and openness, and the lowest possible scores on agreeableness and neuroticism (Schmitt-Rodermund [23], [34]; for calculation of this indicator, see Section 3.2.2). Obschonka, Silbereisen and Schmitt-Rodermund [33] suggest that this comprehensive measure should be able to account for the main dimensions of an individual's personality as a whole. In their empirical analysis, they do indeed find a significantly positive effect of their overall measure of the entrepreneurial personality on the entrepreneurial intentions[2] of scientists working in universities and other research institutions in the German State of Thuringia. Due to the construction of their sample and limitations of the underlying data used, however, Obschonka, Silbereisen and Schmitt-Rodermund [33] could account for only a limited spectrum of other possible influences such as education, professional background, work history, and the regional environment.[3]

Literature on vocational choice suggests that the personality characteristics of an individual have a considerable effect on profession chosen

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[2] Entrepreneurial intentions are understood as the conscious state of mind that directs personal attention, experience, and behavior toward planned entrepreneurial behavior (Bird [35]) and can be regarded as a strong predictor of entrepreneurial activity (Ajzen [36]).

[3] Since all individuals in their sample are scientists, the sample tends to be rather homogeneous with regard to years of education, professional background, and work history. Moreover, variance of regional conditions within the State of Thuringia is rather limited so that the effects of region-specific factors can not be effectively analyzed with these data.

(Holland [37]; Schneider [38]; Filer [39]; Borghans et al. [40]; Krueger and Schkade [41]; Cobb-Clark and Tan [42]). Schneider [38] proposes an attraction-selection-attrition (ASA) model in which individuals are attracted by a certain profession-specific environment and only leave this environment if they realize they are not sufficiently suited to it. This implies that personality characteristics within groups of professions should vary to a much lesser degree than between groups of professions. Particularly, the personality characteristics of a typical individual who belongs to a certain profession may differ quite considerably from the typical personality profile of individuals in other professions. Therefore, it is expected that some professions have higher shares of self-employment than others.[4]

Moreover, if individuals with strong entrepreneurial attitudes are more likely to select into those professions where self-employment is more common, then individuals in such professions will be very much alike in their proclivity for entrepreneurship. We thus expect that the individual personality profile will be a less powerful predictor of self-employment choice within a certain profession or group of professions as compared to others.

Based on these considerations, we test three hypotheses:

- Hypothesis 1: The closer the characteristics of a personality to the entrepreneurial reference type, the higher the propensity of that person to be self-employed.
- Hypothesis 2: The effect of the entrepreneurial fit of a personality on the propensity to be self-employed should be less pronounced in models that control for the profession-specific environment.
- Hypothesis 3: The greater the entrepreneurial fit of a personality, the greater the probability of becoming self-employed.

[4] There are also other factors that make some professions more entrepreneurial than others, such as minimum efficient size of a business, entry regulation (e.g., for lawyers, physicians, etc.), profession-specific role models, etc. See also Section 4.

We analyze the effect of personality traits on actual self-employment of individuals across professions controlling for a number of other individual characteristics as well as characteristics of the regional environment. Specifically, we test the overall measure of entrepreneurial personality proposed by Obschonka, Silbereisen and Schmitt-Rodermund [33] in a broader context. Since actual self-employment is a more reliable indicator of entrepreneurship than entrepreneurial intention, the results of this test should be more convincing than an analysis that is purely based on entrepreneurial intentions as an indicator for entrepreneurship.

3. Data and indicators

3.1 Data

Our empirical analysis is based on the German Socio-Economic Panel (SOEP), a representative longitudinal study of private households in Germany. The SOEP was initiated in 1984 and since then the private households, persons, and families have been surveyed annually (for details, see Haisken De-New and Frick [43] and Wagner et al. [44]). For the present analysis, we use the 2005 wave because it includes information on personality characteristics that was collected only in that year.

The 2005 wave of the SOEP provides data on 21,105 individuals living in Germany. We restrict the analyses to individuals between 18 and 65 years old and exclude persons who were retired or engaged in full-time education.[5] We also do not use information about civil servants or respondents in military service since we consider the choice of profession for these groups to be rather different from that of employees in the private sector. Self-employed farmers are excluded for the same reason.[6] Next, all persons who stated that their primary

[5] The results of the present analysis are robust to the exclusion of unemployed persons.

[6] Most farms in Germany are family businesses, with their owners being more or less self-employed due to their profession. Thus, the self-employment of farmers may be a result of a family tradition or a tradition in the particular region in which they live.

activity is helping in a family business are also omitted because of their mixed status, that is, they are neither “full” entrepreneurs nor “pure” dependent employees. After excluding respondents with missing values for relevant information, there are 9,352 individuals in our sample, 939 of whom are self-employed persons accounting for 10.04 percent of the total sample. This corresponds quite well to the share of self-employed persons in the overall population (Hansch [45]).

Since we know the planning region (Raumordnungsregion) in which each individual in the sample resides, we are able to account for location factors such as an entrepreneurial local environment. Planning regions consist of at least one core city and the surrounding area. Planning regions can be regarded as functional units in the sense of travel-to-work areas.[7]

3.2 Indicators

Previous empirical analyses of the determinants of self-employment have found a significant impact of diverse forms of human capital and social capital, of socio-demographic characteristics, and characteristics of the macro environment on the probability of being self-employed.[8] In our model, we account for these influences to the extent appropriate indicators are available in the data (see Section 3.2.1). Section 3.2.2 introduces indicators for broad individual personality traits—the Big Five—that we include in our analysis.

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[7] Planning regions are slightly larger than what is usually defined as a labor market area. The advantage of planning regions in comparison to districts (Kreise) as spatial units of analysis is that they account for economic interactions between districts. In contrast, a district may be a single core city or a part of the surrounding suburban area. See German Federal Office for Building and Regional Planning (2003) for the definition of planning regions and districts. Information on population is from the Federal Statistic Office (Statistisches Bundesamt). Data on the unemployment rate were obtained from the Federal Employment Agency (Bundesagentur für Arbeit). Information on regional start-up rates is taken from the German Social Insurance Statistics (for details, see Fritsch and Brixy [46]).

[8] For empirical evidence, see, for instance, Evans and Leighton [47], Benz and Frey [9], Borjas [48], Brüderl and Preisendörfer [49], Blanchflower and Oswald [50], Lentz and Laband [51], and Mueller [52].

3.2.1 General determinants of self-employment

We find a number of statistically significant differences between the self-employed and the dependently employed persons in our sample (Table 1). With regard to the regional environment, we find that the start-up rate as measured as the number of new businesses per 1,000 population started by persons between the ages of 15 and 64 tends to be significantly higher in regions where self-employed persons live. Self-employed persons are also more likely to be located in regions with high population density. On average, these individuals have 13.7 years of education, which is significantly more than the average 12.3 years of education of dependently employed persons. Additionally, self-employed persons have experienced longer periods of full-time employment (about 85 percent of their overall time of labor market experience).[9]

There is considerable empirical evidence that the decision to become an entrepreneur may be strongly shaped by peer effects, i.e., by the example of family members, friends, or colleagues who are business owners and act as role models (e.g., Davidsson and Honig [53]; Brüderl and Preisendörfer [49]; Aldrich et al. [54]; Parker [8], 134–138). Hence, we create a variable “at least one parent has been self-employed,” which assumes the value of 1 if at least one parent was an entrepreneur when the respondent was age 15. Indeed,

[9] We use the share of full-time employment in the overall labor market experience instead of the years in full-time employment because the years in full-time employment are highly correlated with a person’s age.

Table 1: Determinants of self-employment: Mean characteristics and t-test of equal means (SOEP 2005)

Variables	Dependently employed	Self-employed
Regional environment		
Regional start-up rate	4.166	4.229***
Regional unemployment rate	9.006	8.807*
Population density	511.334	569.702**
Human capital		
Years of education	12.284	13.747***
Share of full-time employment in the overall labor market experience	0.728	0.847***
Social capital		
Either parent has been self-employed	.081	.170***
Married	.583	.682***
Sociodemographic variables		
Male	.513	.657***
German citizenship	.942	.952
Age	40.687	45.746***
Personal traits		
Openness to experience	4.508	4.953***
Conscientiousness	5.989	6.046*
Extraversion	4.880	5.115***
Agreeableness	5.417	5.407
Neuroticism	3.896	3.674***
Entrepreneurial personality (overall index)	-61.954	-57.021***
Risk propensity	.068	.389***
Profession-specific probabilities of self-employment	.065	.368***
Number of observations	8,413	939

about 17 percent of the self-employed had self-employed parents and can be viewed as “occupational followers.” This figure is almost twice as high as the value we find for dependent employees (Table 1). Furthermore, in our data, there are significantly more married persons among the self-employed than among the dependently employed, which may be due to the on average higher age of self-employed persons. An individual’s age might be an important determinant of entrepreneurship for a number of reasons (see Parker [8], pp.

113-115). Since previous evidence suggests that there is a significant impact of age on the probability of being self-employed, we also include this variable in our model. The self-employed individuals in our sample are on average five years older than the dependently employed persons.

3.2.2 Indicators for broad personality characteristics: The Big Five

The 2005 wave of the SOEP was the first to include questions about personality traits. These questions refer to a psychological scale that measures the Big Five factors (Costa and McCrae [6]) based on three questions for each of the broad dimensions.[10] The SOEP respondents were asked to rate themselves on a seven-point scale, with 1 indicating that a given personality characteristic does not apply to them at all and 7 meaning that the characteristic applies perfectly. Gerlitz and Schupp [55] show that the self-reported personal attitudes based on the Big Five related questions in the SOEP are valid and reliable. Generally, the SOEP is a well-established data source widely used among social scientists.

We calculate the value for each of the Big Five dimensions as arithmetical means of the responses to the three questions. In our sample, self-employed individuals score significantly higher on the dimensions of openness to experience, conscientiousness, and extraversion, and they score significantly lower on the neuroticism dimension (Table 1). This pattern is in line with the majority of other studies on this topic (see Obschonka, Silbereisen and Schmitt-Rodermund [33], and the overview by Rauch and Frese [2]). In constructing an overall measure of an entrepreneurial personality based on all Big Five dimensions, we follow Obschonka, Sibereisen and Schmitt-Rodermund [33]. We first define an entrepreneurial reference type as one who has the highest possible scores (7 for each scale) on the dimensions openness to experience, extraversion, and conscientiousness, and with the lowest possible scores (1 for each scale) on the dimensions neuroticism and agreeableness (Schmitt-Rodermund [23], [34]). In a next step, we calculate the squared values of the

[10] A detailed description of the procedure used in the SOEP survey can be found in Gerlitz and Schupp [55].

deviations from the reference value for each of the Big Five dimensions in order to obtain positive values for both positive and negative deviations. The sum of these squared values of the deviations from the reference value for each of the Big Five dimensions results in an overall measure of a person's deviation from the entrepreneurial reference type. If a person matches this reference type perfectly, the measure of the entrepreneurial personality fit assumes the value of zero. The larger the sum of the squared deviations, the less a person matches the personality of the reference type. To achieve a positive value of the indicator for a perfect match with the entrepreneurial reference type, the sum of the squared deviation is multiplied by –1. Therefore, the indicator can have values between 0 and –180. The median value of this indicator in our sample is –59.778 and the person with the highest entrepreneurial personality fit has a value of –12.2 (see Table A2 in the Appendix). As reported in Table 1, self-employed persons in our sample deviate to a significantly lesser degree from the entrepreneurial reference type than their dependently employed counterparts.[11]

Empirical entrepreneurship research provides evidence that entrepreneurs tend have a higher propensity to take risks than dependently employed persons (Kihlstrom and Laffont [56]; Stewart et al. [4]; Ekelund et al. [5]). Such a relationship can also be found on the basis of an indicator of individual risk attitudes available in our database[12] (see Table 1). Empirical studies show that personality structure defined on the basis of the Big Five is a strong predictor of generalized risk taking (Nicholson et al. [58]; Kowert and Hermann [59]). Additionally, Nicholson et al. [58] show that high extraversion and openness serve as a motivation for risk taking. It is not surprising, then, that

[11] In line with our expectations, the share of self-employed persons in our sample increases with the values of the entrepreneurial personality fit. It is 14.68 percent in the decile of highest values (> 90 percent) for the entrepreneurial personality fit and 4.92 percent in the decile of lowest values (<= 10 percent). The shares of self-employed in the 10^{th}–25^{th}, 25^{th}–50^{th}, 50^{th}–75^{th}, and the 75^{th}–90^{th} percentiles are 7.72, 8.19, 11.33, and 11.52 percent, respectively.

[12] The measure of risk attitudes in SOEP is an experimentally validated 11-point-scale based on the question "Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?", which was asked in the year 2004. For more information about this measure, see Dohmen et al. [57].

the indicator of risk propensity in our database shows considerable correlation with our measure for entrepreneurial personality fit.[13]

4. Results of the multivariate analysis

To test the hypotheses derived in Section 2 we estimate two models of occupational choice by logistic regression with robust standard errors using the entire set of variables discussed in the previous section. The dependent variable in both models assumes the value 1 if the individual was self-employed in the year 2005; 0 otherwise.[14] The general specification of the models is:

$$Pr(y_j \neq 0 \mid E_j, H_j, S_j, F_j, SD_j, C_j) = F(\beta_0 + \beta_h H_j + \beta_s S_j + \beta_{sd} SD_j + \beta_p P_j + \beta_r R_j),$$

where $F(z) = e^z / (1 + e^z)$ is the cumulative logistic distribution. y_j is the dichotomous indicator of self-employment status in 2005; H_j, S_j, SD_j, P_j, and R_j denote human capital, social capital, socio-demographic characteristics, psychological variables, and characteristics of the regional environment, respectively.[15] Parameters β_0, β_h, β_s, β_{sd}, β_p, and β_r are coefficients corresponding to the determinants of entrepreneurship as mentioned above.

To account for an individual's profession-specific environment, we include a control variable—the profession-specific probability of being self-employed—in the second model. This variable was constructed on the basis of International Standard Classification of Occupations at the four-digit level

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[13] The correlation coefficient between risk propensity and entrepreneurial fit is 0.265.

[14] A number of studies, such as the Global Entrepreneurship Monitor (see Bosma et al. [60]), distinguish between self-employed in new firms, which is regarded as entrepreneurship in a narrow sense, and self-employed in older firms, viewed as entrepreneurship in a broader sense. The main motive for such a narrow definition of entrepreneurship is that these studies are primarily interested in the gestation and early development of new businesses, not in old incumbent firms. Assuming that the personality characteristics of entrepreneurs are fairly stable over time, they should not differ much between young entrepreneurs and persons who have been self-employed for a longer period. Unfortunately, our data set does not provide enough cases to perform the analyses in the different occupational groups for young entrepreneurs who recently started a business.

[15] See Table A4 in the Appendix for the correlation matrix of regressors.

(ISCO'88) and, therefore, represents the extent to which a certain profession can be regarded as "entrepreneurial." As discussed above (Section 2), there are a number of reasons why there may be considerable variation in self-employment rates between professional groups. First, according to the person-environment-fit theory (see particularly Holland [37]), individuals tend to choose a professional environment that is consistent with their personality type (Walsh [61]). Therefore, those who remain in a certain professional environment will be rather homogenous in personality characteristics (Schneider [38]).This suggests that individuals with an entrepreneurial type of personality are concentrated in professions characterized by high self-employment rates. Another reason for differences between profession-specific self-employment rates is that it may be easier to set up one's own business in some professions than in others. Hence, the propensity toward self-employment within a certain profession may result from lower entry barriers, such as a smaller minimum efficient size of a profession-specific business with relatively low capital requirements, etc. Furthermore, certain professions, such as being an architect, a psychologist, or a physician, have established role models for self-employment, which may make it seem natural for individuals in these professions to have their own firm. It may also be easier to acquire capital and other resources for setting up a new business when conventional role models of self-employment can be copied. Finally, if education level has an effect on the propensity to start one's own business, self-employment rates may differ due to profession-specific educational requirements.

Table 2 shows coefficients and marginal effects of the independent variables.[16] Model I includes the indicator for overall entrepreneurial personality fit, but does not account for profession-specific probabilities; these are added in Model II.[17] We also estimated a model that contains the individual Big Five

[16] We report both coefficients and marginal effects at the sample means for continuous variables or as discrete change from 0 to 1 for the dummy variable (see Greene [62]).

[17] Testing for a possible nonlinear relationship between entrepreneurial personality fit and the probability of being self-employed did not lead to any significant results.

dimensions instead of the overall indicator of entrepreneurial personality fit (Model III). Overall, the results confirm our hypothesis that individuals whose personality is close to the entrepreneurial reference type have a higher likelihood of being self-employed (see Section 2). According to Model I, the probability of being self-employed increases by 0.109 percentage points for entrepreneurial personalities. In addition, the results point out the importance of socio-economic factors to self-employment. For example, human capital, in terms of years of education, has a strong and statistically significant positive influence on the probability of being self-employed across the entire sample. According to the marginal effect for this variable, each additional year of education increases the probability of being self-employed by 1.08 percentage points. A larger amount of full-time employment in the overall labor market experience has a significantly positive effect on the propensity to be self-employed (increase by 3.44 percentage points). Having self-employed parents has a significant positive influence and increases the likelihood of being self-employed by 5.81 percent points. This confirms the results of several other studies that analyze the characteristics of self-employed persons (Mueller [52]; Aldrich and Cliff [63]; Davidsson and Honig [53]*).* Self-employed persons are more likely to be male and tend to be older than dependent employees.

In the second specification of the model, we add to the set of covariates a variable that controls for the professional environment: the profession-specific probabilities of self-employment. This variable considerably increases the model's explanatory power but leaves the effect of the other variables largely unchanged. Again, closeness to the reference type of an entrepreneurial personality has a significantly positive effect on the propensity to be self-employed, even when controlling for the profession-specific environment. In line with our second hypothesis, the effect of personality characteristics does indeed become smaller when an indicator for profession-specific factors is included, but it is still statistically significant. Compared to Model I, we find that the effect of education level is no longer statistically significant, no doubt because

Table 2: Determinants of self-employment in the overall sample

	Model I		Model II		Model III		Model IV	
Variables	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
Regional start-up rate	0.0750	0.00533	0.0127	0.000594	0.0161	0.000728	-0.263	-0.00350
	(0.0889)	(0.00631)	(0.107)	(0.00503)	(0.108)	(0.00491)	(0.230)	(0.00305)
Regional unemployment-rate	-0.0176	-0.00125	-0.000359	-1.68e-05	-0.00226	-0.000103	-0.00873	-0.000116
	(0.0142)	(0.00101)	(0.0169)	(0.000793)	(0.0172)	(0.000780)	(0.0344)	(0.00046)
Population density	6.89e-06	4.90e-07	7.32e-05	3.43e-06	5.56e-05	2.52e-06	1.76e-05	2.34e-07
	(5.67e-05)	(4.03e-06)	(6.69e-05)	(3.13e-06)	(6.78e-05)	(3.07e-06)	(0.000139)	(1.84e-06)
Years of education	0.152***	0.0108***	0.0258	0.00121	0.0204	0.000926	0.199***	0.0026***
	(0.0123)	(0.000895)	(0.0160)	(0.000750)	(0.0164)	(0.000745)	(0.0275)	(0.00035)
Share of full-time employment in the overall labor market experience	0.483***	0.0344***	0.0815	0.00382	0.168	0.00761	-1.074***	-0.0143***
	(0.157)	(0.0110)	(0.186)	(0.00874)	(0.186)	(0.00842)	(0.262)	(0.00335)
Either parents self-employed	0.651***	0.0581***	0.480***	0.0270***	0.448***	0.0241***	0.484**	0.00791*
	(0.104)	(0.0113)	(0.139)	(0.00921)	(0.138)	(0.00869)	(0.235)	(0.00466)
Married	-0.0682	-0.00488	-0.0628	-0.00296	-0.0331	-0.00150	-0.231	-0.00314
	(0.0849)	(0.00609)	(0.104)	(0.00492)	(0.104)	(0.00475)	(0.205)	(0.00283)
Male	0.365***	0.0258***	0.382***	0.0178***	0.467***	0.0211***	0.0604	0.000804
	(0.0836)	(0.00592)	(0.103)	(0.00478)	(0.104)	(0.00470)	(0.187)	(0.00249)
German	-0.201	-0.0154	-0.381*	-0.0209*	-0.352*	-0.0184	-0.598*	-0.0104
	(0.171)	(0.0141)	(0.199)	(0.0126)	(0.200)	(0.0120)	(0.331)	(0.00730)
Age	0.141***	0.00999***	0.179***	0.00838***	0.185***	0.00837***	0.0776	0.00103
	(0.0280)	(0.00194)	(0.0337)	(0.00153)	(0.0338)	(0.00149)	(0.0587)	(0.00079)
Age2	-0.00118***	-8.35e-05***	-0.00157***	-7.36e-05***	-0.00165***	-7.49e-05***	-0.000723	-9.63e-06
	(0.000315)	(2.20e-05)	(0.000377)	(1.73e-05)	(0.000378)	(1.68e-05)	(0.000701)	(9.39e-06)
Entrepreneurial personality fit	0.0154***	0.00109***	0.0139***	0.000653***	-	-	0.0195***	0.00026***
	(0.00240)	(0.000170)	(0.00305)	(0.000142)			(0.00537)	(7.05e-05)
Openness	-	-	-	-	0.246***	0.0112***	-	-
					(0.0441)	(0.00198)		
Conscientiousness	-	-	-	-	-0.0587	-0.00266	-	-
					(0.0585)	(0.00265)		
Extraversion	-	-	-	-	0.119***	0.00539***	-	-
					(0.0460)	(0.00208)		
Agreeableness	-	-	-	-	-0.0129	-0.000585	-	-
					(0.0514)	(0.00233)		
Neuroticism	-	-	-	-	-0.0717*	-0.00325*	-	-
					(0.0394)	(0.00178)		
Profession-specific probabilities of self-employment	-	-	7.281***	0.341***	7.189***	0.326***	-	-
			(0.256)	(0.0172)	(0.251)	(0.0168)		
Constant	-7.613***	-	-7.652***	-	-9.705***	-	-4.826***	
	(0.756)		(0.920)		(1.013)		(1.640)	
Pseudo R^2	0.0923		0.3534		0.3602		0.0564	
Chi-squared	543.13***		1165.86***		1254.20***		99.53***	
Log-likelihood	-2767.1599		-1971.0325		-1950.4972		-718.149	
Number of observations	9,352	9,352	9,352	9,352	9,352	9,352	8,657	8,657
Number of self-employed	939	939	939	939	939	939	151	151

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

professions, which we control for in Model II, require a certain minimum level of qualification. The third model, which contains the individual Big Five dimensions instead of the overall entrepreneurial personality measure, shows a slightly higher fit (Pseudo R^2 = 0.3602) than the second specification (Pseudo R^2 = 0.3534), but the difference is negligible. We find that measures of openness and extraversion have a significantly positive effect on the propensity to be self-employed, whereas neuroticism is negatively associated with self-employment. These results are in line with most other studies on this topic (see Rauch and Frese [2]).The main findings concerning socio-economic variables remain the same in Models II and III, suggesting that the overall measure of entrepreneurial personality is an appropriate indicator that does not lead to any significant loss of information with regard to the propensity to be self-employed as compared to the individual dimensions of the Big Five.

We do not include the indicator for individual risk attitude that is available in the SOEP database in the models because we assume that the personality traits are an important determinant of an individual's risk attitude (e.g., Nicholson et al. [58]; Kowert and Hermann [59]). Hence, including the Big Five based measure for the entrepreneurial personality fit and the indicator for risk attitude would disturb the relationship between personality traits and entrepreneurship by introducing pronounced multicollinearity into the model.

We test hypothesis 3 by running a model only for those self-employed individuals who just became entrepreneurs (Model IV in Table 2). This excludes the possibility that personality traits are affected by longer periods of self-employment experience. The results of this model show that closeness to the entrepreneurial reference type has a significant positive impact on the propensity to become an entrepreneur, even for those persons who became self-employed only recently (increase by 0.03 percentage points), confirming hypothesis 3. Quite remarkably the marginal effect of the personality traits is considerable smaller as compared to Model I which also included longer-time self-employed persons. There are at least two possible explanations for this finding. First, the smaller effect of personality traits on young entrepreneurs may

be regarded as an indication that personality traits are not stable over time and that there is indeed some kind of feedback effect of longer self-employment experience on the entrepreneur's personality. A second explanation could be that those entrepreneurs which exit self-employment after a short period of time correspond to a lesser degree to the entrepreneurial personality type than those who are in an entrepreneurship for a longer period of time. In the latter case, the lower marginal effect would result from a sample selection bias. However, even if there should be feedback effects of entrepreneurship on the personality traits, we can conclude that an entrepreneurial personality is an important determinant of the predisposition to become self-employed.

5. Self-employment in different types of professions

5.1 Definition of creative professions

Our next investigation into the relationship between self-employment status and entrepreneurial personality is based on a "creative class" classification of professions proposed by Florida [7]. The idea behind this approach is that individuals in certain types of professions tend to be more creative than persons in other professions. Florida [7] suggests that persons in creative professions show a higher propensity to be "economically creative," i.e., self-employed, than persons who are in professions not classified as belonging to the creative class.[18] The aim of the following analysis is to discover the extent to which personality structure is related to self-employment within different professions. According to Hypothesis 2 (Section 2), we expect that the entrepreneurial fit of a personality should be less important in more homogenous groups of professional environments.

[18] "Thus, the varied forms of creativity that we typically see as different from one another—technological creativity (or invention), economic creativity (entrepreneurship), and artistic and cultural creativity—among others—are in fact deeply interrelated. Not only do they share a common thought process, they reinforce each other through cross-fertilization and mutual stimulation" (Florida [7], 33).

Florida [7] proposes distinguishing between several types of professions based on the different degrees of creativity characteristic of them. Under this approach, the creative class consists of professions in which the major task is "complex problem solving that involves a great deal of independent judgment and requires high levels of education of human capital" (Florida [7], 8). Florida divides the creative class into two subgroups: the creative core and the creative professionals. The creative core includes "people in science and engineering, architecture and design, education, arts, music and entertainment, whose economic function is to create new ideas, new technology and/or new creative content" (ibid.) (see Table 3 and Table A3 in the Appendix). Surrounding the *creative core* is "a broader group of *creative professionals* in business and finance, law, health care and related fields" (ibid.). Although the job duties of these professionals are more routine than those of the creative core, they regularly face problems that require creative solutions (e.g., managers). The two subgroups of the creative class, creative core and creative professionals, each possess a high level of human capital, but they differ with regard to the extent to which they use their skills creatively. An important subgroup of the *creative core* is the *bohemians*, which includes artistically creative people such as "authors, designers, musicians, composers, actors, directors, painters, sculptors, artists, printmakers, photographers, dancers, and performers" (Florida [7], 333). Another large subgroup of the creative core is comprised of *engineers*.

Table 3: Overview of professions in the creative class and noncreative professions

Creative core	Painters, artists, photographers, musicians, singers, actors, authors, scientists, teaching professionals, designers, engineers, computer programmers, psychologists, etc.
Creative professionals	Department managers, lawyers, judges, science technicians, engineering technicians, finance and sales associate professionals, health professionals, finance dealers and brokers, insurance representatives, etc.
Noncreative professions	Social work professionals, school inspectors, computer assistants, aircraft pilots, fire inspectors, sanitarians, travel consultants, clearing agents, bookkeepers, police inspectors, secretaries, office clerks, construction workers, bakers, etc.

We follow Florida's [7] approach and classify persons into three groups based on their current occupation: creative core, creative professionals, and noncreative professions. Furthermore, we run separate analyses for two important subgroups of the creative core that may have different characteristics, engineers and bohemians (artists). Analyses for the artists are somewhat restricted due to a relatively small number of these individuals in the data set. The definition of the different classes of professions according to their assumed creativity is based on the International Classification of Occupations (ISCO-88; for details, see International Labour Office [64]), which is available in the SOEP data at the four-digit level. This classification (see Table A3 in the Appendix) is a slightly revised version of the original definition proposed by Florida [7]. In our sample, 13.86 percent (1,149 individuals) belong to the creative core, 22.45 percent (1,861 individuals) are classified as creative professionals, and the remaining 63.69 percent (5,280 individuals) are in professions regarded as relatively noncreative. The sample contains 573 engineers (6.91 percent of the sample and 49.86 percent of the creative core) and 70 artists (0.84 percent of the sample and 6.09 percent of the creative core). Given that our sample is representative of the population at large, these numbers clearly indicate that artists comprise rather a small share of the creative core.

5.2 Self-employment in creative professions

Looking at the self-employment rates in the professional classes as defined above, we notice striking differences (see Figure 1). The highest share of self-employed persons, 23.32 percent, is found in the group of creative professionals, followed by the creative core with 16.27 percent of self-employed. Self-employment in the group of noncreative professions is considerably lower at only 6.02 percent. The two subgroups of the creative core, artists and engineers, have self-employment rates of 34.28 and 13.96 percent, respectively. These figures make it clear that some professional groups are much more economically creative in terms of entrepreneurship than others. Thus, the relatively high self-employment rates for the creative class may, indeed, be an indication of a positive relationship between the personality

characteristics of individuals who choose professions in the creative class and their self-employment status.

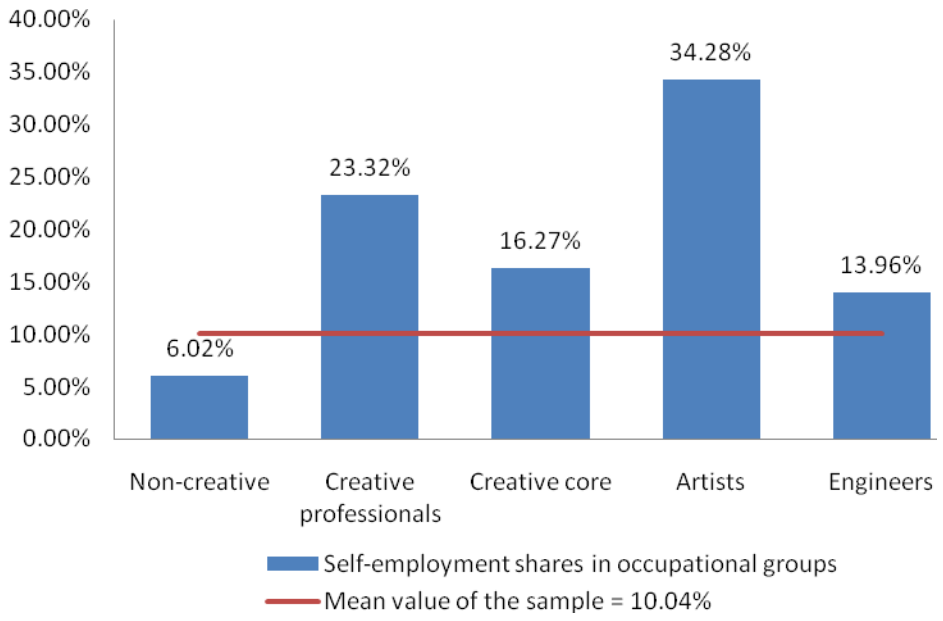

Figure 1: Self-employment shares in groups of professions

To investigate whether self-employed persons *within the professional groups* have a more entrepreneurial personality than their dependently employed counterparts, we perform the same multivariate analyses that we ran for the entire sample[19] (Section 4) for each class of professions separately. We retain the control variable of profession-specific probabilities for self-employment since the groups of professions as defined above are still rather heterogeneous in this respect. Table 4 presents the results (coefficients and marginal effects) for the creative core and the creative professionals, as well as for noncreative professions. Results for the engineers, an important subgroup of

[19] We exclude unemployed individuals from our sample in the following analysis. The restricted sample includes 8,290 economically active individuals.

Table 4: Determinants of self-employment in groups of professions

	Creative core		Creative professionals		Non-creative professions	
Variables	Coefficient	Marginal effect	Coefficient	Marginal effect	Coefficient	Marginal effect
Regional start-up rate	-0.249	-0.0251	0.148	0.0177	0.0683	0.00211
	(0.225)	(0.0227)	(0.182)	(0.0217)	(0.166)	(0.00513)
Regional unemployment-rate	-0.0456	-0.00459	-0.0165	-0.00197	0.0500**	0.00154**
	(0.0374)	(0.00377)	(0.0306)	(0.00366)	(0.0245)	(0.000750)
Population density	0.000315***	3.2e-05***	-4.20e-05	-5.02e-06	3.96e-06	1.22e-07
	(0.000120)	(1.21e-05)	(0.000123)	(1.48e-05)	(0.000103)	(3.19e-06)
Years of education	0.00343	0.000345	-0.0116	-0.00139	0.0493	0.00152
	(0.0344)	(0.00346)	(0.0268)	(0.00322)	(0.0327)	(0.00102)
Share of full-time employment in the overall labor market experience	-1.108***	-0.112***	0.132	0.0158	0.358	0.0111
	(0.378)	(0.0376)	(0.342)	(0.0410)	(0.279)	(0.00860)
Either parents self-employed	-0.290	-0.0268	0.608***	0.0856**	0.785***	0.0336***
	(0.308)	(0.0259)	(0.226)	(0.0368)	(0.207)	(0.0116)
Married	-0.252	-0.0262	-0.109	-0.0131	-0.0335	-0.00104
	(0.213)	(0.0227)	(0.185)	(0.0227)	(0.159)	(0.00494)
Male	0.621***	0.0605***	0.211	0.0250	0.303*	0.00937*
	(0.210)	(0.0194)	(0.177)	(0.0210)	(0.160)	(0.00493)
German	-0.227	-0.0248	-0.295	-0.0389	-0.583**	-0.0231*
	(0.452)	(0.0534)	(0.452)	(0.0652)	(0.272)	(0.0135)
Age	0.136*	0.0137*	0.189***	0.0226***	0.233***	0.00719***
	(0.0754)	(0.00750)	(0.0626)	(0.00727)	(0.0536)	(0.00158)
Age2	-0.000847	-8.53e-05	-0.00157**	-0.00018**	-0.0023***	-7.2e-05***
	(0.000807)	(8.09e-05)	(0.000689)	(8.08e-05)	(0.000624)	(1.85e-05)
Entrepreneurial personality fit	0.00510	0.000514	0.0153***	0.00183***	0.0147***	0.000454***
	(0.00605)	(0.000609)	(0.00572)	(0.000673)	(0.00447)	(0.000137)
Profession-specific probabilities of self-employment	6.310***	0.635***	6.298***	0.753***	9.057***	0.280***
	(0.568)	(0.0617)	(0.317)	(0.0542)	(0.477)	(0.0209)
Constant	-4.839**	-	-7.638***	-	-9.613***	-
	(2.146)		(1.686)		(1.391)	
Pseudo R^2	0.1948		0.425		0.2454	
Chi-squared	158.50***		447.57***		425.52***	
Log-likelihood	-410.953		-581.205		-906.787	
Number of observations	1,149	1,149	1,861	1,861	5,280	5,280
Number of self-employed	187	187	434	434	318	318

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 5: Determinants of self-employment among engineers

	Engineers	
Variables	Coefficient	Marginal effect
Regional start-up rate	-0.000680	-5.76e-05
	(0.378)	(0.0321)
Regional unemployment-rate	0.00638	0.000541
	(0.0632)	(0.00535)
Population density	0.000252	2.13e-05
	(0.000185)	(1.60e-05)
Years of education	0.0558	0.00474
	(0.0566)	(0.00474)
Share of full-time employment in the overall labor market experience	-1.557*	-0.132*
	(0.829)	(0.0682)
Either parents self-employed	-0.305	-0.0236
	(0.561)	(0.0392)
Married	0.0822	0.00688
	(0.339)	(0.0280)
Male	1.734***	0.0957***
	(0.627)	(0.0208)
German	0.479	0.0339
	(0.867)	(0.0504)
Age	0.112	0.00949
	(0.139)	(0.0116)
Age2	-0.000453	-3.84e-05
	(0.00145)	(0.000122)
Entrepreneurial personality fit	0.0107	0.000906
	(0.00960)	(0.000805)
Profession-specific probabilities of self-employment	6.724***	0.570***
	(1.030)	(0.0942)
Constant	-8.285**	-
	(4.130)	
Pseudo R^2	0.181	
Chi-squared	55.68***	
Log-likelihood	-189.724	
Number of observations	573	573
Number of self-employed	80	80

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

the creative core, are provided in Table 5. We are unable to find a statistically significant multivariate model for the subgroup of artists, probably due to the low number of cases in our sample. For comparisons of indicator values between

self-employed and dependently employed persons in the different groups of professions, see Tables A5 and A6 in the Appendix.

Compared to the results for the overall sample (Table 2), there are far fewer explanatory variables that are statistically significant in the analyses for the subsamples. This is most likely because the different groups of professions are considerably more homogeneous with regard to a number of these characteristics. For example, certain professions require more or less the same level of education, which results in similar numbers of years spent in education so that this variable does not contribute to distinguishing between self-employed and dependently employed persons within the creative class. Interestingly, the members of the creative core who experienced relatively long periods of full-time employment during their overall labor market experience are less likely to be self-employed. Being male has a statistically significant effect on self-employment for the creative core, increasing the probability of being self-employed by 6.05 percentage points, and to an even greater degree for engineers (increase of probability by 9.57 percentage points). The age variables are statistically significant at the 1 percent level for the creative professionals and the noncreative professions, but to a lesser degree for the creative core and not significant for engineers. It is remarkable that the profession-specific probabilities of self-employment are statistically significant in all subgroups, even among the relatively narrowly defined subgroup of engineers.

Concerning the variable of particular interest, the measure of entrepreneurial personality, we find that personality structure is a distinguishing characteristic between self-employed and dependently employed persons in both the creative and noncreative professions (increases the probability by 0.2 percent and 0.045 percent, respectively). However, we find no statistically significant effect of entrepreneurial personality fit on the propensity to be self-employed in the creative core. The mean values of this variable for self-employed and dependently employed artists suggest that individuals of either employment status in this subgroup have on average about the same level of entrepreneurial personality fit (see Table A6 in the Appendix). We also see that

dependently employed artists tend to have about the same level of entrepreneurial personality fit as self-employed persons in other profession-specific environments. Perhaps this means that it takes an entrepreneurial personality to choose and stay in a professional environment (e.g., working as an artist) characterized by so much uncertainty in employment opportunities.

6. Conclusions

In this paper, we investigated the relationship between an individual's personality and her or his self-employment status. The entrepreneurial personality was defined on the basis of the Big Five approach. We applied an overall indicator for an entrepreneurial personality that measures the deviation from an entrepreneurial reference type, which scores the highest possible values on the scales of openness, extraversion, and conscientiousness, and the lowest possible values on the scales for agreeableness and neuroticism. We suggested that the entrepreneurial personality should be a distinguishing characteristic between self-employed and dependently employed persons. The results confirm this hypothesis. We found that applying the overall indicator for an entrepreneurial personality does not lead to a major loss of information as compared to estimations that included indicators for the individual dimensions of the Big Five.

Another focus of the analysis was the role played by the type of profession in the decision to be self-employed. Based on the vocational choice literature, we assumed that the characteristics of one's personality affect the choice of profession and expected that the impact of entrepreneurial personality fit would become smaller when accounting for the profession-specific environment. Our analyses showed that the profession-specific probability of self-employment does indeed have a highly significant effect on an individual's decision to be self-employed. If we control for the profession-specific environment with this variable, the effect of the measure for entrepreneurial personality fit becomes considerably smaller. Performing the analysis for different groups of professions distinguished according to Florida's concept of the creative class (creative core, creative professionals, and noncreative professions) as well as for two

important subgroups of the creative core, artists, and engineers, we found that entrepreneurial personality is not a distinguishing characteristic of self-employed and dependently employed persons within occupations belonging to the creative core, which is in line with Schneider [38], who, using his ASA model, argues that individuals in occupational groups are homogeneous with regard to their personalities. Moreover, dependently employed persons in the creative core demonstrate about the same level of deviation from the reference type as the self-employed individuals in other professions. This may be an indication that individuals with higher entrepreneurial attitudes are more likely to select into professions characterized by high levels of self-employment.

For the whole representative sample of the German population, our analyses clearly showed that an individual's personality structure is an important distinguishing characteristic of self-employed persons. There is, indeed, some positive link between personality structure and self-employment that remains statistically significant after controlling for regional factors, socioeconomic indicators, and demographic characteristics. However, according to the estimated marginal effects for the entrepreneurial personality fit, it makes only a minor contribution to the explanation of self-employment. This does, however, not necessarily mean that personality factors are relatively unimportant for the decision to become an entrepreneur. A reason for the rather small effect that we have found for the personality traits in our analyses could also lie in a still insufficient understanding of how one's personality influences the occupational choice that resulted in inadequate modeling of the relevant relationships. Given that entrepreneurial intentions and abilities emerge over a longer period of time, our cross-section analysis can only provide a 'snapshot' of what might be the factors that are important for the decision to start a business. Hence, further research based on a more longitudinal analysis is highly desirable.

In particular, the effect of the profession-specific environment on entrepreneurship is still poorly understood and deserves further investigation. Self-employed people are not only distinctive with regard to certain

characteristics, they are also rather different with regard to their professions. It thus could be appropriate to view entrepreneurial choice as a two-stage process. At the first stage, people choose a profession, and at the second stage, they decide whether or not to become self-employed. Since professions vary with regard to the opportunities and conditions for self-employment, the choice of a certain profession has implications for the likelihood of starting an own business. The results of our analysis suggest that personality characteristics play a role at both stages of this decision process.

Our analysis was constrained by the data set that we used, the German SOEP, in several respects. First, in order to have a sufficient number of cases, we applied a relatively wide definition of entrepreneurship that comprises all self-employed respondents irrespective of when they set up their business, i.e., regardless of whether they had just founded a firm or are long-established business owners.[20] Hence, the entrepreneurs in our sample may be a rather diverse group. Future analyses should focus on more homogenous groups of entrepreneurs, such as those who have just started their business and those who have been established business owners for a longer period of time. Second, our data set does not provide enough cases for multivariate analyses within more narrowly defined professional groups. It would, therefore, be desirable to have larger samples available for study.

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[20] We did, however, run one model (Model IV in Table 2) restricted to those entrepreneurs who had just entered self-employment.

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Appendix: Tables

Table A1: Definition of Variables

Variable	*Description*
Dependent variable	
Self-employment	Dummy = 1 if respondent was self-employed in 2005
Explanatory variables	
Entrepreneurial environment	
Start-up rate	Number of start-ups per 1,000 inhabitants (Raumordnungsregion)
Unemployment rate	Share of unemployed population
Population density	Number of inhabitants per km²
Human capital	
Years of education	Number of years the respondent has been in full-time education
Share of full-time employment in the overall labor-market experience	Ratio of number of years in full-time employment and number of years in full-time employment, part-time employment, and unemployment
Social capital	
Either parent has been self-employed	Dummy = 1 if either parents was self-employed when the respondent was 15 years old
Married	Dummy = 1 if respondent was married in 2005
Sociodemographic characteristics	
Male	Dummy = 1 if respondent is male
German citizenship	Dummy = 1 if respondent is German citizen
Age	Years of age
Personality characteristics	
Openness to experience	Mean score on the 7-point scales for: “I see myself as someone who has an active imagination” “I see myself as someone who is original and comes up with new ideas” “I see myself as someone who values artistic experiences”
Extraversion	Mean score on the 7-point scales for: “I see myself as someone who is communicative, talkative” “I see myself as someone who is outgoing, sociable” “I see myself as someone who is reserved” (reversed)
Conscientiousness	Mean score on the 7-point scales for: “I see myself as someone who does a thorough job” “I see myself as someone who tends to be lazy” (reversed) “I see myself as someone who does the things effectively and efficiently”
Agreeableness	Mean score on the following 7-point scales: “I see myself as someone who is somewhat rude to others” (reversed) “I see myself as someone who has a forgiving nature” “I see myself as someone who is considerate and kind to others”
Neuroticism	Mean score on the 7-point scales for “I see myself as someone who worries a lot” “I see myself as someone who gets nervous easily” “I see myself as someone who is relaxed, handles stress well” (reversed)

Table A1 continued:

Variable	*Description*
Entrepreneurial personality fit	Deviation from entrepreneurial reference type
Risk propensity	An 11-point-scale based on the question: “Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?” The value 0 means “risk averse” and the value 10 means “fully prepared to take risks.”
Profession-specific probabilities of self-employment	Average probability of being self-employed in the respective profession based on ISCO’88 at a 4-digit level

Table A2: Descriptive statistics for variables

Variable	Mean	Median	Minimum	Maximum	Standard deviation
Self-employment	0.100	0	0	1	0.301
Regional start-up rate	4.173	4.160	3.232	5.523	0.534
Regional unemployment-rate	8.987	8.644	4.178	16.547	3.222
Population density	517.194	244.886	48.209	3814.819	736.911
Years of education	12.431	11.5	7	18	2.614
Share of full-time employment in the overall labor market experience	0.741	0.920	0	1	0.330
Either parents self-employed	0.090	0	0	1	0.286
Married	0.593	1	0	1	0.491
Male	0.527	1	0	1	0.499
German	0.943	1	0	1	0.231
Age	41.196	42	18	65	11.260
Conscientiousness	5.996	6	1.333	7	0.864
Extraversion	4.904	5	1	7	1.122
Agreeableness	5.416	5.333	1	7	0.961
Openness to experience	4.553	4.667	1	7	1.161
Neuroticism	3.874	4	1	7	1.204
Entrepreneurial personality fit	-61.459	-59.778	-149.889	-12.222	16.421
Risk propensity	4.869	5	0	10	2.212
Profession-specific probability of being self-employed	0.101	0.036	0	1	0.170

Table A3: Definition of creative professions

	ISCO-88
Creative Professionals	1110–1120;1140–1232;1234–2351;2359–2443;2445;2451–2455;2470–3119;3131–3132;3211–3212;3221;3223–3241;3310–3413;3416–3419;3432;3434;3471–3475;7312–7313;7324–7332;7433.
Creative Core	1236–1237;2111–2213;2310–2351;2359;2431–2443;2445;2451–2455;3131;3310–3340;3434;3471–3474;7313;7324;7433.
Engineers	2111–2213.
Artists	2451–2455.

Table A4: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Self-employment	1																	
2	Regional start-up rate	0.036	1																
3	Regional unemployment-rate	-0.019	-0.441	1															
4	Population density	0.024	0.404	0.137	1														
5	Years of education	0.168	0.037	0.058	0.088	1													
6	Share of full-time employment in the overall labor market experience	0.108	-0.02	0.019	-0.014	0.125	1												
7	Either parents self-employed	0.094	0.069	-0.074	0.043	0.108	-0.012	1											
8	Married	0.06	-0.003	-0.046	-0.045	0.053	0.187	0.006	1										
9	Male	0.087	-0.003	-0.02	0.004	0.029	0.359	0.005	0.027	1									
10	German	0.013	-0.067	0.124	-0.023	0.117	0.03	0.02	-0.029	-0.031	1								
11	Age	0.135	0.016	0.027	0.021	0.101	0.326	0.027	0.443	0.025	0.1	1							
12	Conscientiousness	0.02	-0.029	0.046	-0.047	-0.047	0.121	-0.027	0.109	-0.067	-0.001	0.159	1						
13	Extraversion	0.063	0.005	0.028	0.013	0.002	-0.06	0.02	-0.033	-0.115	-0.001	-0.058	0.185	1					
14	Agreeableness	-0.003	-0.033	0.021	-0.015	0.01	-0.083	-0.007	0.016	-0.173	-0.008	0.035	0.309	0.105	1				
15	Openness to experience	0.115	0.042	0.025	0.059	0.141	-0.03	0.049	-0.03	-0.066	0.02	0.019	0.167	0.377	0.139	1			
16	Neuroticism	-0.055	-0.039	0.037	-0.009	-0.101	-0.092	-0.025	0.016	-0.184	-0.008	0.015	-0.121	-0.153	-0.131	-0.075	1		
17	Entrepreneurial personality fit	0.09	0.052	-0.006	0.032	0.109	0.103	0.034	-0.017	0.152	0.024	-0.019	0.12	0.487	-0.432	0.45	-0.587	1	
18	Risk propensity	0.116	0.004	0.028	0.012	0.092	0.046	0.03	-0.1	0.202	0.013	-0.103	-0.027	0.179	-0.096	0.167	-0.143	0.265	1
19	Profession-specific probability of being self-employed	0.567	0.044	-0.034	0.013	0.274	0.121	0.098	0.043	0.106	0.039	0.081	0.009	0.049	-0.018	0.107	-0.057	0.095	0.099

Table A5: Determinants of self-employment in classes of professions: mean characteristics and t-test of equal means (SOEP 2005)

	(1) Creative core		(2) Creative professionals		(3) Noncreatives	
Variables	Employed	Self-employed	Employed	Self-employed	Employed	Self-employed
Entrepreneurial environment						
Regional start-up rate	.042	.043*	.042	.043	.042	.041
Regional unemployment rate	9.052	8.806	8.721	8.529	8.753	9.187**
Population density	567.787	756.585***	555.614	536.146	489.614	505.6
Human capital						
Years of education	15.05	15.33	13.447	14.152***	11.624	12.264***
Share of full-time employment in the overall labor market experience	0.795	0.774	0.790	0.872***	0.727	0.856***
Social capital						
Either parent has been self-employed	.116	.117	.093	.205***	.073	.154***
Married	.655	.657	.612	.684***	.591	.692***
Sociodemographic variables						
Male	.568	.647**	.505	.649***	.501	.673***
German citizenship	.971	.946*	.969	.970	.936	.931
Age	42.961	46.952***	40.922	46.158***	40.303	44.475***
Personal traits						
Openness to experience	4.853	5.329***	4.622	4.868***	4.422	4.848***
Conscientiousness	5.91	5.869	6.014	6.051	6.027	6.143**
Extraversion	4.814	4.964*	4.948	5.187***	4.88	5.107***
Agreeableness	5.417	5.482	5.425	5.434	5.413	5.327
Neuroticism	3.755	3.579*	3.775	3.617**	3.903	3.807
Entrepreneurial personality fit	-59.433	-57.047*	-59.805	-56.805***	-62.422	-57.299***
Risk propensity	4.995	5.725***	4.994	5.663***	4.694	5.546***
Profession-specific probabilities of self-employment	.133	.285***	.133	.566***	.053	.21***
Number of observations	962	187	1,427	434	4,962	318

Table A6: Determinants of self-employment in classes of professions: mean characteristics and t-test of equal means (SOEP 2005)

	Artists		Engineers	
Variables	Employed	Self-employed	Employed	Self-employed
Entrepreneurial environment				
Regional start-up rate	.044	.043	.042	.043
Regional unemployment rate	8.715	9.221	8.535	8.917
Population density	854.108	846.491	591.611	737.395
Human capital				
Years of education	15.815	15.145	15.438	15.75
Share of full-time employment in the overall labor market experience	0.814	0.710	0.882	0.895
Social capital				
Either parent has been self-employed	.130	.166	.127	.113
Married	.630	.542	.687	.75
Sociodemographic variables				
Male	.630	.458	.829	.937**
German citizenship	.956	.916	.967	.975
Age	45.022	44.125	43.290	48.4***
Personal traits				
Openness to experience	5.217	6.125***	4.654	4.995***
Conscientiousness	5.659	5.722	5.852	5.95
Extraversion	4.920	5.486**	4.636	4.754
Agreeableness	5.311	5.597	5.277	5.427
Neuroticism	3.572	3.847	3.698	3.345***
Entrepreneurial personality fit	-56.343	-56.166	-59.169	-56.029*
Risk propensity	5.6	5.416	5.229	6.1***
Profession-specific probabilities of self-employment	.329	.417***	.133	.237***
Number of observations	46	24	493	80